1957-1

The Nucleus

Northeastern Section of the American Chemical Society

VOL. XXXIV, No. 4 JANUARY, 1957

The NUCLEUS

OF THE NORTHEASTERN SECTION OF THE AMERICAN CHEMICAL SOCIETY

January 10, 1957 Thursday, 4:00 p.m.

Symposium, "Patents in the Chemical Field"

W. JOHN SLOAN

of the duPont Company, of Wilmington, Delaware

January 10, 1957 Thursday, 8:00 p.m.

PLACES OF MEETINGS

Dinner, 6:30 p.m.

The Campus Room, M.I.T. Graduate House

Symposium and Address in Huntington Hall (Room 10-250)

The Massachusetts Institute of Technology

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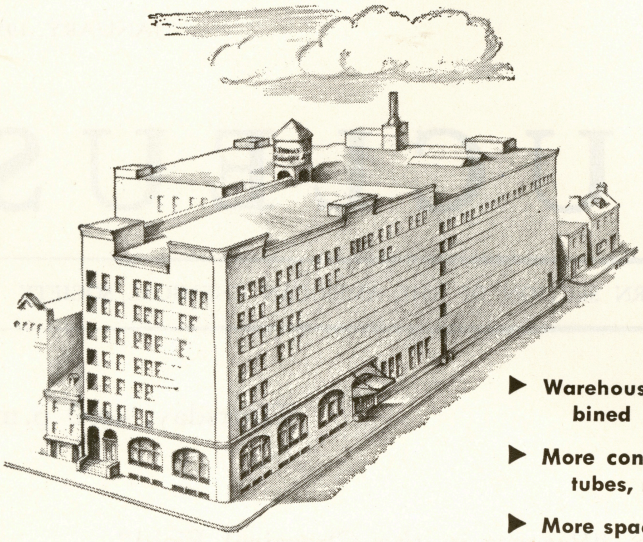

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THE FOUR-HUNDRED AND FIFTY-SEVENTH MEETING

of the

NORTHEASTERN SECTION A. C. S.

THURSDAY, JANUARY 10, 1957

The Massachusetts Institute of Technology, Room 10-250

Entrance, 77 Massachusetts Avenue or the Dorrance Biology Laboratories

AFTERNOON MEETING

Symposium, "PATENTS IN THE CHEMICAL FIELD"
Theodore C. Browne of Dewey and Almy Chemical Company, Chairman

4:00 p.m. First speaker.
L. William Bertelsen of Kenway, Jenney, Witter and Hildreth, Counsellors at Law, Boston.

4:40 p.m. Second speaker.
Robert E. Meyer of Dewey and Almy Chemical Company.

5:20 p.m. Questions and Discussion.

5:30 p.m. Preprandial Hour (reservations necessary) Campus Room, followed by

6:30 p.m. Dinner (reservations necessary) in the Campus Room of the M.I.T. Graduate House entrance from the street, 308 Memorial Drive.

Price $2.75 per person (tax incl.)

Should you desire a place reserved, mail the enclosed post card, at once. or, after 2:30 p.m. Thursday, call UNiversity 4-6900, Ext. 2961.

EVENING MEETING

Edward R. Atkinson, presiding

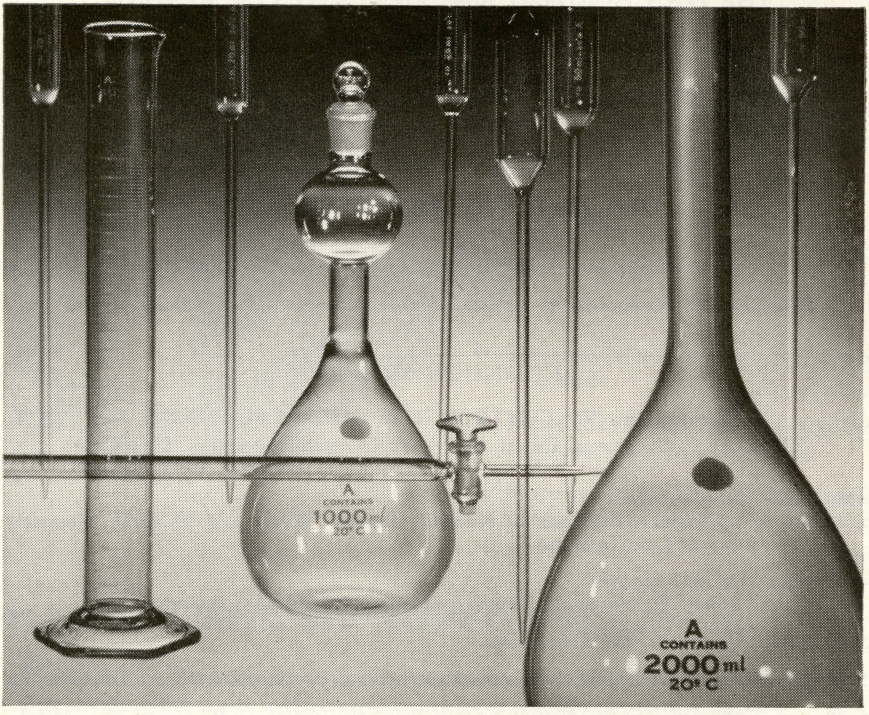
8:00 p.m. W. John Sloan, of E. I. duPont de Nemours and Company.
"Ion Exchange Resins and Their Uses"

Signing and mailing the dinner card or telephoning for reservations must be regarded as an obligation.

All interested are invited.

After five-thirty o'clock, the Reception Hall of the Campus Room, 308 Memorial Drive, west side of the Graduate House, will be available for members of the Section planning to attend the dinner.

A Committee will be in charge.



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The NUCLEUS

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Forms close for advertising on the 15th of the month and for text on the 12th of the month preceding issue.

Editorial

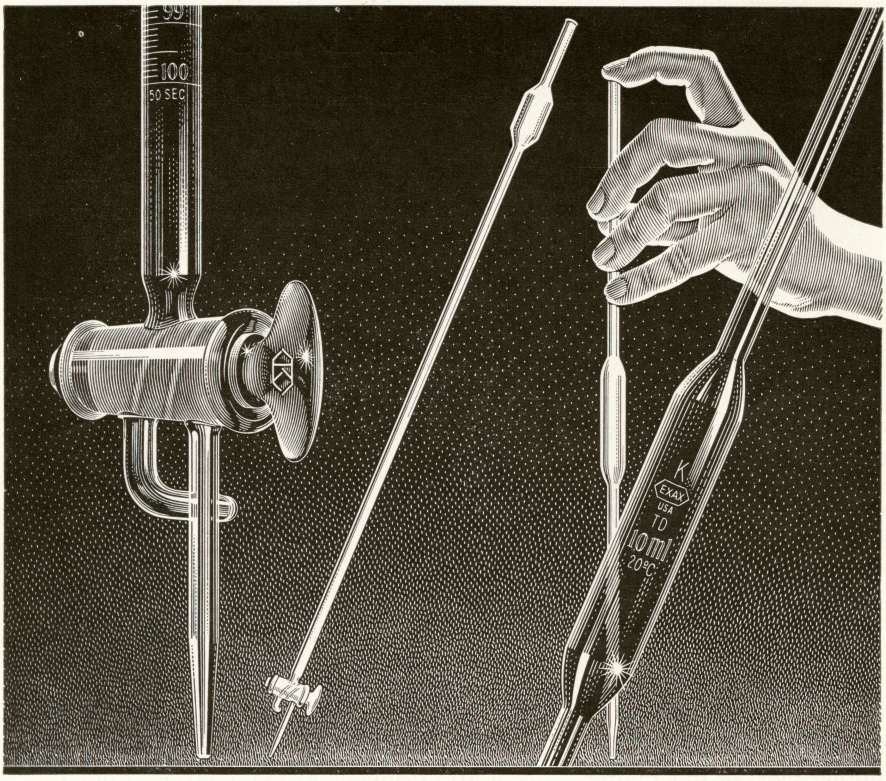
COME THE NEW YEAR

Although the first meeting of the Northeastern Section for a given year falls on the second Thursday in October and might be called, quite reasonably, "The New Year" for the section, the march of the years takes another view of this matter. Local arrangements to the contrary, notwithstanding, come January the first, we will be wishing each other health and prosperity. Sociability, thus established, may well lead to consideration of possible opportunities for service that 1957 will present.

A look down the coming months shows two special events for the year. In May, the Norris Medal will be presented for the fourth time. How to make this occasion both memorable and commemorative presents a strong challenge. Memorable it should be in keeping alive the memory of Dr. Norris and in honoring the recipient.

The second special event is the Annual Student Night. Still nearly a year away, the occasion already casts its shadow across the months to come. How to reach even larger numbers of students is a problem for consideration, long before the Student Night for 1957 comes into close view. In fact, the experience of December, 1956, fresh in the minds of all in the Northeastern Section, should form a background for reaching out for a larger coverage for the Student Night of 1957.

Student Night has become almost a tradition—something to be taken for granted. It is a good tradition. To be even more embracing is a problem for Student Night. It seems very appropriate to link the Norris Award with Student Night. Dr. Norris was always the students' best of friends.



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JANUARY SPEAKER

W. JOHN SLOAN

W. John Sloan, the speaker before the Northeastern Section in January, was born in Atlanta, Georgia, in October 1909. His college background was gained at the Georgia Institute of Technology where he received the B.S. degree in chemical engineering in 1932 and the M.S. degree in the same field in 1933.

All of his technical experience has been gained with the du Pont Company. He began in 1933 as a Plant Operator and technical assistant. From 1936 to 1952, he served as water consultant. Since 1952 he has been Ion Exchange Consultant. The ion exchange work started in 1936. He has continued it to the present time for water treatment and process applications.

So important is water quality and supply to plant operation, that the title, Water Consultant, is the second highest technical title in the du Pont Company. The duties of this office include an active part in plant site selection, methods for treating water for boilers, for cooling towers and tests of water to be used for any part of the company operations. Mr. Sloan was a member of the team selecting the site of the plant at Hanford, Washington, at Savannah, Georgia, and, in fact, all of the war plants built by the du Pont Company.

Mr. and Mrs. Sloan, with their son and daughter, live in Wilmington, Delaware.

THE NUCLEUS wishes the members of the Northeastern Section a HAPPY NEW YEAR.

SYMPOSIUM CHAIRMAN

THEODORE C. BROWNE

Mr. Theodore C. Browne, chairman of the symposium on "Patents in the Chemical Field" was born in Salem, Massachusetts, July 17, 1892. He received the baccalaureate from Harvard in 1915. From 1917 to 1919, during the World War, 1914-1918, he was a lieutenant in the Engineering Division of the Ordnance Department. Thereafter, while employed in the Brush Laboratories in Cleveland, he became interested in patent work. This experience led him to attend law school in Chicago. Beginning in 1934, he has been head of Dewey and Almy Patent Department which he helped to form.

Mr. Browne's scientific interests have been chiefly in the colloid chemistry of rubber and analagous substances.

SYMPOSIUM SPEAKER

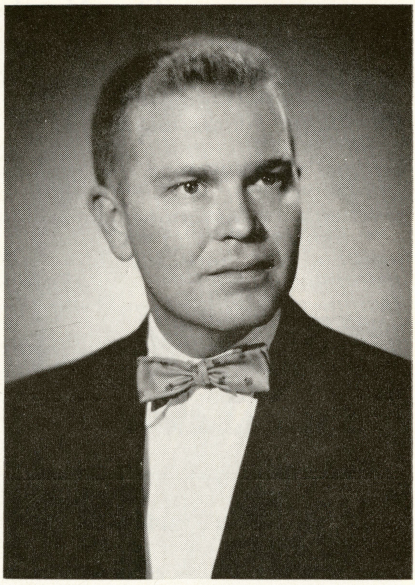
L. WILLIAM BERTELSEN

L. William Bertelsen was born in 1924 in Dormont, Pittsburgh, Pennsylvania. He received his elementary and high school education in the public schools of Mt. Lebanon, Pennsylvania. He obtained the Bachelor of Chemical Engineering degree from Cornell University in 1947.

This period of time was occupied with a military career, beginning in 1943 with the V-12 program and ending in 1946 with a release from active duty as Ensign in the U. S. Navy Reserve. He was then stationed at the Charlestown Naval Shipyard as Radio Direction Finder Calibration Officer. With this title went two aircraft rescue boats, converted for use as mobile transmitters for calibrating radio direction finders.

During his final year at Cornell, 1946-1947, he became increasingly interested in the general field of inventions and their protection. The Director of the Chemical Engineering School, Fred H. Rhodes, encouraged him to pursue this interest.

He entered the Harvard Law School in 1947 and was graduated in 1950.



L. WILLIAM BERTELSEN

His introduction to the patent field was made during the summer of 1948 in the patent department of Dewey and Almy Chemical Company. This experience was followed in 1949 with a summer term in the patent department of the United Shoe Machinery Corporation. Following graduation, in 1950, he began work with the Boston firm of Kenway, Jenney, Witter and Hildreth. He became a member of the firm in 1953.

His law practice deals largely, but not exclusively, with chemical and engineering matters such as tanning, ion exchange, electrodialysis, filtration, plastics, drugs, pigments, instrumentation and materials handling.

He was married to Joyce Cook of Yonkers, New York, in 1945. Mr. and Mrs. Bertelsen with their son, Karl Eric, make their home in Wayland, Massachusetts, where he is a member of the Planning Board. His outside activities include amateur theatricals (mostly back stage) and the Wayland United Nations Association.

SHOCK WAVES, FLASH LAMPS AND FAST REACTIONS

By Norman R. Davidson
of the California Institute of Technology

(Résumé of an address before the Northeastern Section of the American Chemical Society)

There are two problems that must be solved for the measurement of a very fast reaction. A method must be devised for very rapidly preparing a reaction mixture in a non-equilibrium state and means must be found for following the subsequent approach to equilibrium. For reactions in which the reactants and products are colored, a photocell-oscilloscope combination can be used for measuring changes in concentration occurring in less than 10^{-6} seconds.

In general, the sample preparation problem is more difficult. A shock wave is a steep fronted pressure wave which propagates through a gas at a supersonic velocity. It therefore provides an excellent method for very rapidly heating and compressing a gas and can be used as the sample preparation method for gas phase reactions initiated by a change in temperature.

One dimensional shock waves of controlled, uniform strength are generated in the laboratory in a shock tube. This consists of a long pipe separated by a diaphragm into a section containing high pressure driving gas and a section containing low pressure driven gas. The diaphragm is broken rapidly and a compressional (shock) wave propagates through the low pressure gas. Temperatures from ambient to 20,000° K can be so obtained in the driven gas. The method is appropriate for reaction times in the 10^{-3} to 10^{-5} second range.

As an example, Dr. Garry Schott's investigation of the pyrolysis of N_2O_5 may be cited. The mechanism is given here.

$$N_2O_5 \rightarrow NO_2 + NO_3 \quad \ldots\ldots (1)$$
$$NO_3 + NO_2 \rightarrow NO_2 + O_2 + NO \quad \ldots\ldots (2)$$
$$NO_3 + NO \rightarrow NO_2 + NO_2 \quad \ldots\ldots (3)$$
$$NO_3 + NO_3 \rightarrow NO_2 + O_2 + NO_2 \quad \ldots\ldots (4)$$

The interest in this reaction stems, in part, from the fact that it involves the unstable free radical, NO_3. The presence of NO_3 was demonstrated directly by spectroscopy and the rates of reactions for (1), (2) and (4) were measured. (The rate of (3) was too fast to be measured.) This investigation, therefore, provided direct experimental evidence for the occurrence and properties of NO_3. Previously, its existence had been inferred indirectly in order to explain the kinetics of various reactions involving N_2O_5.

It is interesting to note that it has been discovered, recently, by Ashmore and Leavitt, in Cambridge, that NO_3 is an intermediate in the thermal decomposition of NO_2. That is, the reaction scheme,

$$NO_2 + NO_2 \rightleftarrows NO_3 + NO$$
$$NO_3 + NO \rightarrow NO_2 + N_2$$

actually participates in parallel with the classical Bodenstein bimolecular reaction path,

$$ONO + ONO \rightarrow O\text{-}N\text{-}O\text{-}O\text{-}N\text{-}O \rightarrow ON + O_2 + NO$$

The quantitative results of the shock wave work as to the properties of NO_3 are in good agreement with this new discovery in the study of the thermal decomposion of NO_2.

Both flash lamp methods and shock wave methods can be used to initiate the reaction for the study of the kinetics of the following processes.

$$M + I_2 \underset{k_R}{\overset{k_D}{\rightleftarrows}} M + I + I$$

M represents a "third body" for the reverse reaction, the recombination of iodine atoms. The results are unusual in several respects. The rate constant, k_R, decreases with increasing temperature. Furthermore there is a marked increase in the value of k_R as the molecular complexity of the catalyst or third body, M, is increased. Iodine (I_2) itself, is the most effective third body known, indicating the existence of the molecule, I_3, with a binding energy of about 5 k cal.

The development of hypersonic flight requires an understanding of the rate of the corresponding dissociation and recombination reactions for O_2, N_2, O and N. It is not yet known whether these reactions will show the same general characteristic as the halogen molecule and atom reactions.

SYMPOSIUM SPEAKER

ROBERT E. MEYER

Robert E. Meyer is Patent Attorney for Dewey and Almy Chemical Co., the Cryovac Company, and Dewey and Almy Overseas Company —all divisions of W. R. Grace & Co., with offices in Cambridge.

He was born at Garden City, Long Island, New York, in 1921.

A graduate of St. Paul's School, Garden City, he received a Bachelor of Arts degree from Harvard College (1943), a Master of Science in Chemical Engineering from Massachusetts Institute of Technology in September (1946), and a Bachelor of Laws degree from Northeastern University School of Law, in 1952.

A Lieutenant JG in the United States Navy during World War II, he has been employed by Dewey and Almy since October 1946. For two years he worked on container sealing compounds. In 1948 he transferred to the Patent Department of Dewey and Almy where he continues to be employed. He is a registered patent attorney, a member of the Massachusetts Bar, and a member of Sigma Xi. Mr. and Mrs. Meyer make their home in Lexington, Massachusetts.

BOSTON SECTION OF THE ELECTROCHEMICAL SOCIETY

The third meeting of the Boston Section of the Electrochemical Society will be held on Wednesday, January 9, 1957, in the Campus Room of the M.I.T. Graduate House. Mr. Robert C. Wade, Assistant Director of Chemical Research, Metal Hydrides, Beverly, Massachusetts, will speak on

"Metal Hydrides—New Compounds for Industry"

A dinner at 6:30 p.m. in the Campus Room of the M.I.T. Graduate House will be preceded by a prepandial hour at 5:45 p.m. Following the dinner Mr. Wade will speak in the Campus Room in the M.I.T. Graduate House at 7:45 p.m. Reservations for the dinner may be made by writing to Charles Levy, 61 Central Street, Auburndale 66, Mass., or by telephoning to him at WA 4-8540, Extension 685. The price of the dinner will be $3.00.

All interested persons are invited.

ANALYTICAL GROUP

DONALD L. GUERNSEY, Chairman, M.I.T., UN 4-6900, Ext. 3306

FRANK O'HALLORAN, Secretary - Treasurer, Water Laboratory, Commonwealth of Massachusetts, UN 4-6900, Ext. 3306

The fourth meeting of this year will be held at 8:00 p.m. on Wednesday, January 16, 1957, in Room 2-131, M.I.T.

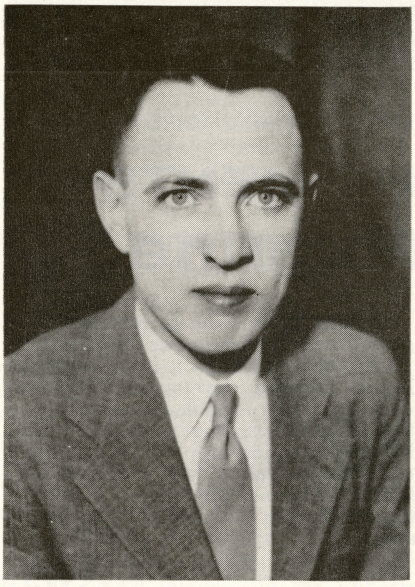
Thomas R. P. Gibb, Jr., of Tufts University, will speak on

"Research in Analysis"

Prior to the meeting there will be a dinner at 5:45 p.m. in the M.I.T. Faculty Club on the sixth floor of the Sloan Building at 50 Memorial Drive, Cambridge. Reservations may be made by telephoning Mr. Donald L. Guernsey, UN 4-6900. Ext. 3306.

All interested persons are invited.

ANALYTICAL SPEAKER



THOMAS R. P. GIBB, JR.

Thomas R. P. Gibb, Jr., was born in Belmont, Massachusetts, February 10, 1916. He attend the Belmont Public Schools in preparation for Bowdoin College where he was graduated, cum laude in chemistry in June 1936. The following fall he entered the Graduate School of the Massachusetts Institute of Technology where he obtained the doctorate in 1940 in the field of organometallic compounds, working with Professor Avery A. Morton.

While still a graduate student he became an instructor in chemistry in the Massachusetts Institute of Technology. Later he was promoted to the rank of assistant professor. He continued this work until 1946 when he went to Beverly, Massachusetts, to establish a research laboratory at Metal Hydrides, Inc. His textbook, "Optical Methods of Chemical Analysis," was published in 1942.

After five very busy years at Metal Hydrides, Inc., he joined the staff of Tufts College, now University, where he holds the title of Associate Professor and Director of Sponsored Research.

Dr. Gibb became secretary of the Northeastern Section of the American Chemical Society in 1946 and Chairman in 1952. He has served several years as a national councillor. He is a past president of the Boston Microchemical Society which, in time, affiliated with the Northeastern Section as the Analytical Group. He is a member of the American Chemical Society, the New England Association of Chemistry Teachers, the American Rocket Society, the Optical Society of America, the American Association for the Advancement of Science, Phi Beta Kappa, Sigma Xi, and Alpha Chi Sigma. He is the senior author of fourteen scientific papers and of several patents, chiefly in the field of metal hydrides. His chief researches have been in metal hydrides and methods of analysis.

Dr. and Mrs. Gibb and their two children make their home in Winchester, Massachusetts.

ACS PROGRAM OVER WMEX

The ACS program, OBJECTIVES, is carried again over WMEX, on Thursday evenings at 7:15 o'clock. Each story relates a chemical development believed to be important to the public.

That the response to this program has been good is indicated by the loud protests to the station when an attempt was made to remove it.

ELASTOMER & PLASTICS GROUP

JOHN B. GREGORY, Chairman, Frederick S. Bacon Laboratories, WAtertown 4-5000

MAX TAITEL, Chairman-elect, Union Bay State Laboratories, Inc., TRowbridge 6-8076

The third meeting of the year, 1956-1957, will be held at 8:00 p.m. on Thursday, January 17, 1957, in the new Goodyear Building at 66 B Street, Needham Heights 94, Massachusetts, just off Route 128. The meeting will be preceded by a preprandial hour at 5:30 p.m. and a dinner at 6:30 p.m. in the Pillar House, 26 Quinobequin Road, close by the junction of Routes 128 and 16, at exit 49.

Refreshments for the preprandial hour will be available at the usual prices of the Pillar House. The dinner will cost $3.00. Reservations must be made through Joseph M. Donahue at Goodyear Tire and Rubber Company, 66 B Street, Needham Heights 94, Massachusetts either by writing or by telephoning, NEedham 3-5850. The deadline for reservations is 10:00 a.m., Monday, January 14, 1957.

Dr. George E. Hulse of the Spencer Chemical Company, Kansas City, Missouri, will speak on

"Polyethylene Polymerization"

All interested persons are welcome to the dinner and to the meeting

PLASTICS GROUP SPEAKER

GEORGE E. HULSE

George E. Hulse was born at Newark, New Jersey, on March 1, 1908. He received both the bachelor of science degree and the doctorate (in physical chemistry) from Yale University. His major field of interest has been the structure and behavior of high polymers. He has been associated with the General Laboratories of the U. S. Rubber Company at Passaic, New Jersey, and the Experimental Station of the Hercules Powder Company. His publications and patents have covered antioxidants for rubber, rubber hydrochloride, copolymerization, free radicals reactions and vedox systems.

Since 1955, Dr. Hulse has been coördinator for Plastics Research and Development with the Spencer Chemical Company, Kansas City, Missouri.

MEETING OF THE DIRECTORS

The December meeting of the Directors was held at 4:30 p.m. in the Moore Room at M.I.T., Chairman Edward R. Atkinson presiding. The following were present: Avery A. Ashdown, Robert D. Eddy, Austin W. Fisher, Laurence S. Foster, James H. Gardner, Lawrence J. Heidt, Arno H. A. Heyn, Henry A. Hill, David M. Howell, Howard H. Reynolds, Lockhart B. Rogers, Martha B. Thomas, John C. Sheehan and Stephen S. Winter. The minutes of the November meeting were approved as distributed.

Avery A. Ashdown disclosed that approximately 100 student affiliates will receive the December issue of THE NUCLEUS.

According to Arno H. A. Heyn, Chairman of the Membership Committee, the Section had 2226 members as of November 23, 1956.

Stephen S. Winter reported for the Public Relations Committee. Negotiations are currently underway for a Sunday morning television program to be presented live over WBZ-TV. At present, the Committee is cooperating with WGBH-TV in publicizing a filmed lecture series by Glenn Seaborg. Broad publicity is also being given the ACS radio program "Objective" which is currently presented by Station WMEX at 7:00 p.m. every Sunday. The Committee is very satisfied with the press coverage the Section has been getting since a paid consultant has been retained.

The report of the Committee on Chemistry Education was presented by Howard H. Reynolds. The Committee recommends that the Newell Award be increased from $50.00 to $75.00 and that the number of awards be reduced from four to three. A letter will be sent out to assist high school teachers in obtaining summer employment. The details are being handled by the N.E.A.C.T. The midwinter lecture series for high school teachers is being modified to include trips to Boston College and Godfrey L. Cabot, Inc. A short talk will be presented during each trip. The Committee has also cooperated with the A.A.A.S. by purchasing two shares

(*Please turn to Page* 93)

MEETING OF THE DIRECTORS

(*Continued from Page* 91)

at $25.00 each to help students in preparing science projects.

On a motion duly made and seconded, it was

> VOTED: that the Secretary be authorized to notify the President of the N.E.A.C.T. that it is the Northeastern Section's intention to offer three Lyman Newell Awards of $75.00 each to individual teachers within the confines of the Northeastern Section to help defray the expense of attending the N.E.A.C.T. summer conference to be held in August of 1957.

Under new business, Avery A. Ashdown indicated that prompt action is needed on the decision regarding a Section Directory. Budgets of prospective advertisers are usually prepared before the first of the year.

On a motion duly made, and seconded, it was

> VOTED: that the Northeastern Section publish a combined Constitution and Directory in the summer of 1957.

Lockhart B. Rogers expressed concern over the percentage of members attending meetings and voting in the annual election. An analysis of the annual reports of other sections indicates that a change in the type of meetings may help the situation. It was recommended that a questionnaire be sent to the members on this matter.

There being no further business, the meeting adjourned at 6:10 p.m.

Respectfully submitted,

RIDGLEY G. SHEPHERD, JR.
Secretary of the Northeastern Section of the American Chemical Society

NORTHEASTERN SECTION FUNDS

The Northeastern Section was incorporated May 26, 1926 under the laws of Massachusetts. The legal name of the corporation is The Northeastern Section of the American Chemical Society, Incorporated.

The Section has five funds, namely:

The Northeastern Section General Fund.

The Norris Award Fund.

The Permanent Trust Fund.

The Publications Fund.

The Richards Medal Fund.

The Northeastern Section will welcome gifts and bequests at any time. Checks payable to John T. Blake, Treasurer of the Board of Trustees, may be sent to his address, Simplex Wire and Cable Company, 78 Sidney Street, Cambridge, Mass.

Funds given to the Northeastern Section should be left in the following manner:

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